DEPARTMENT OF ENVIRONMENTAL QUALITY
PERMITTING and COMPLIANCE DIVISION
MONTANA GROUND WATER POLLUTION CONTROL SYSTEM (MGWPCS)

Statement of Basis

Permittee:	Coronado Resources USA, LLC
Permit No.:	MTX000205
Receiving Water:	Class I Ground Water
Facility Information:	
Name	Madison Mine
Location	N 45° 41' 34", W 112° 17' 45" T 2S, R 6W, Section 2, Madison County
Facility Contact:	Dan Everett, Geological Engineer P.O. Box 18 Silver Star, MT (406) 565-4188
Fee Information:	
Number of Outfalls	One (1)
Outfall – Type	001 – Mine Dewatering

I. Permit Status

The Department received a new application from Coronado Resources USA, LLC (CR) on October 22, 2007. The application is for a new permit issued under the Montana Ground Water Pollution Control System (MGWPCS). The Department determined the discharge application package, DEQ Forms 1 and GW-2 and supplemental information, to be complete July 18, 2008 after four iterations of the application. The applicant submitted information and responses to Department notices of deficiency notices on January 16, 2008, April 8, 2008, and June 23, 2008.

The proposed discharge is a new source and subject to the Montana Nondegradation Policy (75-5-303, MCA) and Administrative Rules (ARM 17.30.701, et seq.).

The applicant has applied separately for an authorization to discharge storm water under the Department's "General Permit for Storm Water Discharges Associated with Mining and With Oil and Gas Activities (MTR300000)".

At present, CR is exploring and mining under an Exploration Permit (#0066) issued by the Department's Environmental Management Bureau in accordance to the Montana Metal Mine Reclamation Act (MMRA). Once in operation, CR will operate the mine under the small miner exclusion authorized under the MMRA (SMES #25-167).

II. Facility Information

A. Facility Description

CR operates an underground gold and copper mine, located one and a quarter mile west of Silver Star, Montana. To facilitate underground mining, CR uses a deep well to drawdown the local ground water ahead of mining. The extracted ground water is the effluent that is discharged to two percolation ponds for disposal into the shallow alluvium (Figures 1-site map and 2-water use line-drawing). Water required for underground mining is taken from the extracted ground water and the remaining is disposed to the local shallow aquifer through two percolation ponds.

Two wells (DW-1 and DW-2) are used to lower the ground water for mining. DW-1 is completed in unmineralized limestone and DW-2 is completed in the nearly vertical (east dipping) brecciated contact between the mineralized skarn and unmineralized limestone. The applicant described the local geology as a limestone roof pendant that trends northwest-southeast and is boarded by a granodiorite to the north and east, Precambrian gneiss and schist to the west side, and Jefferson River valley alluvium to the south-southeast. A mineralized skarn deposit exists along the intrusive-metamorphic contact. Ground water infiltrating into the limestone roof pendant is characterized by the applicant as creating an "isolated aquifer which only receives recharge from precipitation" (June 23, 2008 application submittal).

Two previously mined surface pits (referred to as the American and Black Pits) exist on the property and are located on the surface immediately above the mineralized zone. Information submitted with the application states that the pits will be used to contain storm water run-off and will not discharge collected water to surface water. The storm water is allowed to infiltrate; the applicant stated that infiltrated water from the pits is intercepted by the DW-2 and combined at an unknown rate with unaltered ground water. The American pit is underlain by a granodiorite that the permittee states has a very low permeability (June 23, 2008 application submittal). The Black Pit mined the surficial expression of the mineralized zone directly atop the underground mining operation.

According to information submitted on January 16, 2008, DW-2 provides 100% of ground water drawdown and is used exclusively for the dewatering needs. DW-1 is used only as a secondary dewatering well and will be used if DW-2 is down for maintenance or malfunctions. The maximum pumping rates for DW-1 and DW-2 are 130 and 225 gallons per minute (gpm), respectively. Dewatering needs are expected to range from 30-225 gpm, based on storage and seasonal effects. The average flow is reported on the application as 75 gpm (Figure 2).

Extracted ground water is routed through a control vault referred by the applicant as the "West Tank" (Figure 2; the "East Tank" is storage for water used underground). The West Tank is a sunken vault that houses valves, piping, control units and meters for flow, pH and specific

conductivity (SC). From the West Tank, dewatering well water is routed to the percolation ponds.

Ore is not milled on-site; however, an ore storage area and crusher pad exist on-site (Figure 1). Waste rock is stored in the existing pits (from pervious mining) and used for backfill in mine-out underground workings.

CR's consulting engineer reported that the underground mining requires approximately 1,000 gpd. This water is collected underground in sumps and allowed to infiltrate. The applicant stated that the infiltrated water used for the underground mining is captured by DW-2 and discharged to the percolation ponds.

A 600 foot 6" HDPE waterline transports the effluent from the west tank to the percolation ponds (Outfall 001). The effluent is split between the percolation ponds; 90% goes into the west pond and 10% into the east pond. Information supplied with the permit application states that significant leakage occurs from the west pond to the east pond, thereby consuming a significant amount of the east pond storage. Application materials submitted on January 16, 2008 state that the seepage from the west into the east pond ranges from 60 to 180 gpm.

The two percolation ponds are located at the bottom of Tom Benton Gulch, an ephemeral drainage. The ponds are excavations and were not constructed with engineered slopes (e.g. 2:1). Excavated materials were left around the ponds as storm water berms. Operational depths are reported by the consulting engineer as being 18-23 feet below ground surface (letter received by the Department on June 23, 2008). The storm water berms augment an additional five feet of depth. Operational depth will vary between zero and 23 feet depending on the dewatering needs of the mine. Table 1 summarizes pond size information submitted with the application. The engineer reported that the infiltration rate is conservatively estimated as 225 gpm. Site specific infiltration rates from the ponds to the ground water are unavailable.

Table 1: Infiltration pond design summary (volume based on six foot operating depth)

Pond	Dimensions, feet	Footprint area, square feet	Volume, cubic feet (est. gallons)
West	210 x 90	710	4,260 (32,000)
East	280 x 90	873	5,238 (44,000)
	TOTAL	**1,583**	**9,498 (76,000)**

B. Effluent Characteristics

The effluent characteristics are that of the ground water extracted ahead of the underground mining. Inorganic nitrogen (N) species (nitrate and ammonia) are expected to be present due to its presents in blasting agents. The applicant supplied effluent quality results from single sampling event on the application (Table 2). GW-2 requires the applicant to supply metals reported as total recoverable, while the ground water standards are reported as dissolved.

Table 2: Effluent quality from Application form GW-2

Parameter	Units	Reported Value
pH (minimum-maximum)	s.u.	7.6-8.2
Total Suspended Solids (TSS)	mg/L	11.0
Biochemical Oxygen Demand (BOD_5)	mg/L	9.0
Oil and Grease	mg/L	<1
Total Residual Chlorine	mg/L	<0.010
E. coli Bacteria (5)	mg/L	<1
Dissolved Oxygen	mg/L	7
Total Ammonia as N	mg/L	0.12
Total Kjeldahl Nitrogen	mg/L	0.12
Nitrate + Nitrite as N	mg/L	0.584
Total Phosphorus as P	mg/L	0.68
Total Dissolved Solids	mg/L	357
Specific Conductivity	mg/L	680
Chloride	mg/L	15.6
Sulfate	mg/L	129
Alkalinity, as $CaCO_3$	mg/L	174
Total Phenolic Compounds	mg/L	<0.010
Hardness as $CaCO_3$	mg/L	218

Limited additional effluent quality data is on-file as required by the MMRA exploration permit. The applicant has collected and reported additional dissolved metals data for arsenic, cadmium, copper, chromium, lead, manganese, nickel, selenium, uranium, and cyanide for the period April 14, 2008 through October 15, 2008. These data are combined with the one-time event reported on the application and summarized in Table 3.

Table 3: Effluent metals data

Parameter µg/L	Category [1]	Minimum	Maximum	Median	Number of samples
Antimony	T	---	<50.3	---	1
Arsenic	C	1.2	4.4	1.3	10
Beryllium	C	---	<0.059	---	1
Cadmium	T	0.08	1.39	0.10	10
Chromium	T	0.49	<16	<1.3	10
Copper	T	3.3	19.7	7.3	10
Iron	H	---	39.5	---	1
Lead	T	0.03	2.65	0.10	10
Manganese	H	2.8	38.4	7.9	10
Mercury	T	---	0.069	---	1
Nickel	T	0.34	<31	<5.7	10
Selenium	T	1.9	2.6	2.2	10
Silver	T	---	<0.368	---	1
Thallium	T	---	0.14	---	1
Zinc	T	---	144	---	1
Cyanide, total	T	3.8	<10	<10	5

1. T = toxic, C = carcinogen, H = harmful as identified in DEQ-7 (February 2008)

C. Compliance History

Because the facility is new and not yet constructed, a compliance evaluation or site inspection has not been completed.

III. Site Characteristics

The applicant proposes to discharge wastewater into the shallow alluvial aquifer that underlies the percolation ponds in Tom Benton Gulch, an ephemeral drainage to Cherry Creek, a perennial tributary to the Jefferson River. According to application materials, the shallow aquifer consists of well graded alluvium consisting of fine sand to rounded boulders. Well logs from the monitoring wells suggest that the alluvium is about 30 feet thick and is underlain by silty sand and occasional gravel (Water and Environmental Technologies, 2007). Well logs available through the Montana Bureau of Mines and Geology (MBMG) and cited in the permit application show that shallow wells near the percolation ponds correlate with the shallow aquifer. The well logs state that the water table is approximately 20 to 36 feet below ground surface.

The applicant included a ground water contour map that was produced in August 2007 based on water levels measured in the monitoring wells and near-by private wells. Based on this map, the applicant reported that the ground water flow direction is southwest from the discharge to the Jefferson River. While that may be the general trend, in reviewing the contour map and the topography, ground water flow may be better described as due east as the path of Tom Benton Gulch. Then, approximately 1,000 feet downgradient of the ponds (near the monitoring wells), the gulch widens as it meets Cherry Creek and its flood plane. In this area, the ground water contours indicate that ground water is moving southeast with bearing of S 45°E. Near the town of Silver Star, the contours show the shallow ground water flowing due south to the Jefferson

River. The applicant reported that Cherry Creek is located 3,140 feet east of and the Jefferson River is 3,950 feet east-south east of the percolation ponds.

The applicant completed slug test on its two monitoring wells. The calculated hydraulic conductivity (K) is 0.03 to 0.05 feet/day (Water and Environmental Technologies, 2007). Based on the average K (0.04 feet/day), the applicant estimated that discharged water from the percolation ponds would reach the nearest downgradient private well in 640 years.

Ground water quality samples have been collected monthly from the two monitoring wells located downgradient of the percolation ponds. These water quality data were summarized in the permit application and presented in Table 4.

Specific conductivity (SC) values from the wells ranged from 736 to 974 µS/cm with a reported average of 811 µS/cm. Ground water that is less than 1,000 µS/cm at 25°C is classified as Class I ground water (ARM 17.30.1006). Class I ground waters must be maintained suitable for public and private water supplies, culinary and food processing, irrigation, commercial and industrial purposes, drinking water for livestock and wildlife, with little or no treatment. Human health standards listed in DEQ Circular 7 (February 2008) apply to concentrations of dissolved substances in Class I ground water.

The ground water in the vicinity of the discharge is considered high quality water pursuant to Montana's Nondegradation Policy. Degradation of high quality water is not allowed unless authorized by the Department under 75-5-303(3), MCA.

Pan evaporation rate information was submitted with the April 8, 2008 application. The reported evaporation rate is 6.41 inches/month, representative of July. Using the pond surface area (Table 1; total area 1581 sq. feet), the volume that would evaporate is 0.14 gpm, which is insignificant compared to the pumping rate and assumed infiltration rate.

Site-specific soil information was not included in the application. The Natural Resource Conservation Service (NRCS) web soil survey shows that Tom Benton Gulch in the vicinity of the percolation ponds is Yetull loamy sand. The Yetull is reported to be sandy and gravelly alluvium derived from schist and/or granite and gneiss. It is reported to be "somewhat excessively drained" and the capacity of the most limiting layer to transmit water is "high to very high" (NRCS, 2008). This soil type has been rated as "somewhat limited" for rapid infiltration of wastewater. This soil rating means that the soil is moderately favorable for the specified use and that the limitations can be overcome through planning, design, and installation (NRCS, 2008).

Table 4: Ground Water Characteristics from Application Form GW-2				
Parameter, units	**Units**	**No. of Samples**	**Reported Range**	**Average Value**
Specific Conductance	µS/cm	22	736 - 974	811
Total Dissolved Solids (TDS)	mg/L	2	485 - 526	506
pH, s.u.	s.u.	22	7.1 – 8.0	7.8
Chloride	mg/L	2	43.5 – 44.5	(1)
Escherichia Coli Bacteria	CFU/100-mL	2	<1	(1)
Nitrite + Nitrate, as N	mg/L	20	1.44 – 2.4	2.05
Kjeldahl Nitrogen, as N	mg/L	2	0.24 – 0.26	(1)
Total Organic Carbon	mg/L	2	0.94 – 1.07	(1)
Sulfate	mg/L	18	168 -242	197
Calcium	mg/L	15	56.1 – 68.3	62.4
Magnesium	mg/L	17	18.0 – 22.1	20.0
Sodium	mg/L	17	58.6 – 91.8	72.3
Potassium	mg/L	17	7.1 – 8.4	7.7
Aluminum, dissolved	µg/L	17	<45 – <60	<47
Arsenic, dissolved	µg/L	17	2 - 5	3
Cadmium, dissolved	µg/L	17	0.03 – 0.54	0.17
Chromium, dissolved	µg/L	17	0.8 – 10.2	3.7
Copper, dissolved	µg/L	17	0.9 – 4.5	2
Iron, dissolved	µg/L	17	<15 – 59.6	19.8
Lead, dissolved	µg/L	17	0.21 – 1.4	0.43
Manganese, dissolved	µg/L	17	0.1 -13	1.4
Nickel, dissolved	µg/L	17	1.9 - <25	<13.4
Selenium, dissolved	µg/L	17	4.2 – 7.2	5.6
Uranium, dissolved	µg/L	17	4.0 – 5.7	5.2
Zinc, dissolved	µg/L	17	0.01 – 0.05	0.02
Cyanide, total	µg/L	6	5.9 – <20	(2)

(1) The application reported that two values were collected; an arithmetic average is not shown.
(2) Reported values for total cyanide were qualified by "J" = analyte detected below the reporting limit; method used was E335.2. No average was calculated.

IV. Mixing Zone

The applicant did not request a mixing zone and the Department determined one was not necessary for limit derivation. During permit development, the Department may determine a mixing zone is necessary (ARM 17.30.515).

V. Proposed Discharge Limitations and Conditions

Permits are required to include effluent limits when the discharge quality does not meet state water quality standards. Montana water quality standards define both water use classifications for all state waters and numeric and narrative standards that protect those designated uses.

Water quality limitations must be established in permits to control all pollutant or pollutant parameters that are or may be discharged at a level which will cause, have reasonable potential to cause or contribute to an excursion above any state water quality standard. The permittee must comply with the permit developed by the Department in accordance with the Montana Numeric Water Quality Standards included in Circular DEQ-7 (February 2008) and protection of beneficial uses (ARM 17.30.1006). Ground water quality standards may be exceeded within a Department authorized mixing zone, provided that all existing and future beneficial uses of state waters are protected (ARM 17.30.1005).

A. Applicable Water Quality Standards

A discharge to Class I ground water is subject to the specific water quality standards of ARM 17.30.1006, which incorporates by reference Department Circular DEQ-7 "Montana Numeric Water Quality Standards" (2007). Potential pollutants of concern for the CR discharge are nutrients (nitrate as nitrogen (N), metals, and cyanide.

<u>Nondegradation Consideration</u>

New sources, as defined in ARM 17.30.703(16), are subject to Montana Nondegradation Policy (75-5-303, MCA) and regulations (ARM 17.30.701-718, "Nondegradation of Water Quality"). ARM 17.30.702 defines "new or increased source" as an activity resulting in a change of existing water quality occurring on or after April 29, 1993. Outfall 001 is a new source for the purposes of nondegradation. Effluent quality of Outfall 001 is subject to a nonsignificance review.

The Department review of proposals for new or increased sources will determine the level of protection required for the receiving water, based on: a) existing and anticipated used and the water quality necessary to protect and maintain those uses; and b) degradation that may be allowed only according to the procedures in ARM 17.30.708. These rules apply to any activity that may cause degradation of high quality waters, for any parameter, unless the changes in existing water quality resulting from the activity are determined to be nonsignificant under ARM 17.30.715 or 17.30.716.

ARM 17.30.715 states criteria that are used to determine nonsignificance. These criteria consider the quality and strength of the pollutant, the length of time the changes will occur, and the character of the pollutant. For this specific discharge to be considered nonsignificant, the following criteria must be met:

1. Discharge containing carcinogenic parameters or parameters with a bioconcentration factor greater than 300 at concentrations less than or equal to the concentrations of the parameters in the receiving water;
2. Discharge containing toxic parameters or nutrients which will not cause changes that equal or exceed the trigger values in DEQ-7. Whenever the change exceeds the trigger value, the change is not significant if the resulting concentration outside a department designated mixing zone does not exceed 15% of the lowest applicable standard.
3. Changes in the water quality for any harmful parameter for which water quality standards have been adopted other than nitrogen, phosphorus, and carcinogenic, bioconcentrating, or toxic parameter, if the changes outside the mixing zone is less than 10% of the applicable standard and the existing water quality level is less than 40% of the standard; and
4. The change in the concentration of nitrate in ground water will be less than 7.5 mg/L at the boundary of any applicable mixing zone.

Based on information presented in the application, pollutants expected present in the discharge are inorganic nitrogen (N) (nitrate and ammonia) and metals (arsenic, cadmium, copper, mercury, selenium, thallium, and zinc).

Inorganic N – For discharges to ground water, all forms of nitrogen are assumed to be converted to nitrate as N in the subsurface. To be nonsignificant, the predicted concentration at the boundary of the mixing zone cannot exceed 7.5 mg/L nitrate as N.

Metals – All discussions for ground water limit development refer to the metal in the dissolved fraction. Metals characterized as "toxic" parameters in DEQ-7 meet the nonsignificance criteria if discharged concentrations are less than 15% of the lowest applicable standard.

Arsenic, beryllium, and uranium are carcinogens. To remain nonsignificant, discharge cannot cause an increase in the receiving water above background concentrations.

Iron and manganese have secondary contaminant levels based on aesthetics, taste, and odor. The standards are 300μg/L and 50 μg/L for iron and manganese, respectively. Public and private water supplies and industrial uses with "little to no treatment" is a beneficial use of the receiving water (ARM 17.30.1006). Changes to the water quality that would impact a beneficial use is prohibited. Iron and manganese "harmful" parameters, as identified in DEQ-7 (February 2008). To be nonsignificant, a discharge cannot exceed 40% of the applicable standard when the receiving water is less than 40% of the standard.

Cyanide – Historically, cyanide milling was used in reworking gold tails through the 1940s (DEQ, 2008). Cyanide is not proposed or permitted for metals extraction for the current project. The cyanide standard is 200 μg/L and it is a toxic parameter; to be nonsignificant, 15% of the applicable standard is 30 μg/L.

B. Calculated Effluent Quality

Nitrate as N –The Department assumes that all forms of nitrogen (organic and inorganic – i.e. nitrate, nitrite, and ammonia as N) discharged are converted to nitrate as N in the underlying soil and beyond. The total N in the effluent is estimated to be 0.7 mg/L (Table 2). The receiving water TN is 2.7 mg/L (Table 4). The discharge is less than background and 7.5 mg/L, and is therefore nonsignificant. The discharge does not have the reasonable potential to cause an exceedance to the receiving water quality and does not need an effluent limit. Effluent analyses for nitrogen species will be required effluent monitoring.

Metals – All discussions for ground water limit development refer to the metal in the dissolved fraction. Because the applicant did not request a mixing zone, the lowest ground water standards are applicable to the discharge at the end of control. Metals standards that meet the nonsignificance criteria at ARM 17.30.715 are presented in Table 5.

Arsenic, cadmium, chromium, lead, and nickel

Effluent limits are necessary for arsenic, cadmium, chromium, lead, and nickel because the reported effluent quality for these metals are higher than the receiving water and at or near the standard (based on nonsignificance criteria). To maintain the discharge as a nonsignificant source, the effluent quality must meet or be less than 15% of the water quality standard.

Copper, selenium, and zinc

Reported effluent values for copper and selenium are all less than the receiving water quality and the nonsignificant criteria for water quality. Zinc is reported in the effluent at a value greater than the receiving water, but is lower than the standard (based on nonsignificant criteria). Effluent limits for these parameters are not necessary because reasonable potential to exceed water quality standards does not exist. Monitoring of the effluent and from the monitoring wells will be required for these parameters.

Antimony, beryllium, mercury, silver, and thallium

Insufficient data exists to analyze the impacts to the receiving water quality for antimony, beryllium, mercury, silver, and thallium because the applicant did not provide data for the receiving water. Effluent data for all of these parameters are less than the nonsignificant criteria for water quality. No effluent limits are necessary because there is no reasonable potential to exceed the water quality standards. Effluent monitoring will be required for these parameters. These parameters will also be required monitoring in the downgradient monitoring wells.

Iron and manganese

The receiving water quality for iron and manganese less than 40% of the standard. To maintain the discharge as a nonsignificant source, the discharge must be less than 10% of the standard.

Table 5: Effluent, receiving water quality, applicable standards, and necessary limit summary.

Parameter (in µg/L)	Maximum Reported Effluent Value (µg/L)	Receiving water quality (µg/L) [1]	Applicable Standard (µg/L) [2]	Limit?	Rational
Antimony	<50	ND [3]	0.9	No	No receiving water data
Arsenic	4.4	3	3 *	Yes	Discharge cannot increase background
Beryllium	<0.06	ND [3]	0.06	No	No receiving water data
Cadmium	1.4	0.2	0.75	Yes	Effluent > receiving water & standard
Chromium	<16	3.7	15	Yes	Effluent > receiving water & standard
Copper	19.7	2	195	No	Effluent > receiving water but <standard
Iron	39.5	19.8	120	No	Effluent > receiving water but <standard
Lead	2.65	0.41	2.2	Yes	Effluent > receiving water & standard
Manganese	19.3	1.4	20	Yes	Effluent > receiving water but <standard
Mercury	0.07	ND [3]	0.3	No	No receiving water data
Nickel	31	<13.4	15	Yes	Effluent > receiving water & standard
Selenium	2.6	5.6	7.5	No	Effluent < receiving water & standard
Silver	<0.4	ND [3]	15	No	No receiving water data
Thallium	0.14	ND [3]	0.3	No	No receiving water data
Uranium	5.5	5.2	5.2 *	Yes	Discharge cannot increase background
Zinc	144	<0.02	300	No	Effluent > receiving water but <standard
Cyanide, total	<10	Refer to Table 4	30	No	Effluent < receiving water & standard

1. Average, as reported on application.
2. For toxic parameters, the applicable standard shown is 15% of the ground water standard, per ARM 17.30.715(1)(c). For harmful parameters, the applicable standard shown is 40% of the ground water standard, per ARM 17.30.715(1)(f).
3. ND means "no data" reported by the applicant.

* Average receiving water quality reported as "applicable standard" (background) for carcinogens; ARM 17.30.715(1)(b).

Cyanide – Reported effluent values for cyanide range from 3.45 µg/L to less than detection (reported as <10 µg/L). Reported receiving water quality is of the same quality, but detection limits make the data difficult to summarize. The reported effluent quality is lower than the standard. An effluent limit for cyanide is not necessary because reasonable potential to exceed water quality standards does not exist. Monitoring of the effluent and from the monitoring wells is required for these parameters.

VI. Proposed Effluent Limits

The following effluent limits are applicable to the discharge at the last point of control: the waterline into the percolation ponds.

Proposed Final Effluent Limits: Outfall 001			
Parameter	Units	Effluent Limitations	
		Daily Maximum Limit	Rational [1]
Arsenic, dissolved	µg/L	3.0	Background
Cadmium, dissolved	µg/L	0.75	15% of standard
Chromium, dissolved	µg/L	15	15% of standard
Lead, dissolved	µg/L	2.3	15% of standard
Nickel, dissolved	µg/L	15	15% of standard
Uranium, dissolved	µg/L	5.2	Background
1. Based on nonsignificance criteria at ARM 17.30.715.			

VII. Monitoring Requirements

A. Effluent Monitoring

Samples will be collected at the end of the waterline into the percolation ponds and analyzed for the following parameters at the specified frequency and sample type.

The applicant will be required to report the maximum and monthly average flow rate and specific conductivity.

Analytical methods must be 40 CFR 136 approved methods unless otherwise approved by the Department. Analysis must meet the Required Reporting Values listed in DEQ-7 (February 2008). PQL (Practical Quantification Limits) are not acceptable substitutions for RRV.

Effluent Monitoring Requirements – Outfall 001				
Parameter	Unit	Sample Frequency	Sample Type[1]	RRV [2]
Discharge flow rate	gpm	Continuous	Instantaneous	---
pH	s.u.	Continuous	Instantaneous	0.1
Specific Conductivity	µS/cm	Continuous	Instantaneous	0.1
Nitrate plus Nitrite as N	mg/L	1/Month	Composite	10.0
Total Ammonia as N	mg/L	1/Month	Composite	10.0
Total Kjeldahl Nitrogen	mg/L	1/Quarter	Composite	---
Total Inorganic Phosphorus as P	mg/L	1/Quarter	Composite	1.0
Antimony, dissolved	µg/L	1/Quarter	Composite	3.0
Arsenic, dissolved	µg/L	1/Month	Composite	3.0
Beryllium, dissolved	µg/L	1/Quarter	Composite	1.0
Cadmium, dissolved	µg/L	1/Month	Composite	0.08
Chromium, dissolved	µg/L	1/Month	Composite	1.0
Copper, dissolved	µg/L	1/Month	Composite	1.0
Iron, dissolved	µg/L	1/Month	Composite	50.0
Lead, dissolved	µg/L	1/Month	Composite	0.5
Manganese, dissolved	µg/L	1/Month	Composite	5.0
Mercury, dissolved	µg/L	1/Quarter	Composite	0.01
Nickel, dissolved	µg/L	1/Month	Composite	10.0
Selenium, dissolved	µg/L	1/Month	Composite	1.0
Silver, dissolved	µg/L	1/Month	Composite	0.5
Thallium, dissolved	µg/L	1/Quarter	Composite	0.2
Uranium, dissolved	µg/L	1/Month	Composite	---
Zinc, dissolved	µg/L	1/Month	Composite	10.0
Cyanide, Total	µg/L	1/Month	Grab	5.0

Footnotes:
1. See Definitions section at end of permit for explanation of terms.
2. The Required Reporting Value (RRV) is the detection level that must be achieved in reporting ground water monitoring or compliance data to the Department. The RRV is the Department's best determination of a level of analysis that can be achieved by the majority of the commercial, university, or governmental laboratories using EPA approved methods or methods approved by the Department. PQL (Practical Quantification Limits) are not acceptable substitutions for RRV.

B. Ground Water Monitoring

The receiving ground water has low to non-detect concentrations for metals. Because discharged effluent comes from a mineralized area that contains higher metal concentrations, the permittee will be required to monitor and report the ground water quality at the existing two monitoring wells (identified on the permit application as the "North" and "South" wells). All samples must be analyzed for dissolved metals.

Monitoring Requirements – North and South monitoring wells

Parameter	Unit	Sample Frequency	Sample Type[1]	RRV
Static Water Level	feet	1/Quarter	Instantaneous	NA
Water temperature	° C	1/Quarter	Instantaneous	NA
pH	s.u.	1/Quarter	Instantaneous	0.1
Specific Conductivity	µS/cm	1/Quarter	Instantaneous	NA
Total Ammonia, as N	mg/L	1/Quarter	Grab	0.05
Nitrate + Nitrite, as N	mg/L	1/Quarter	Grab	0.01
Kjeldahl Nitrogen, Total, as N	mg/L	1/Quarter	Grab	NA
Total Nitrogen, as N [3]	mg/L	1/Quarter	Calculated	NA
Total Phosphorus	mg/L	1/Quarter	Grab	0.001
Antimony, dissolved [4]	µg/L	1/Quarter	Grab	3
Arsenic, dissolved	µg/L	1/Quarter	Grab	3
Beryllium, dissolved	µg/L	1/Quarter	Grab	1
Cadmium, dissolved [4]	µg/L	1/Quarter	Grab	0.08
Chromium, dissolved [4]	µg/L	1/Quarter	Grab	1
Copper, dissolved [4]	µg/L	1/Quarter	Grab	1
Iron, dissolved [4]	µg/L	1/Quarter	Grab	50
Lead, dissolved [4]	µg/L	1/Quarter	Grab	0.5
Manganese, dissolved [4]	µg/L	1/Quarter	Grab	5
Mercury, dissolved [4]	µg/L	1/Quarter	Grab	0.1
Nickel, dissolved [4]	µg/L	1/Quarter	Grab	10
Selenium, dissolved [4]	µg/L	1/Quarter	Grab	1
Silver, dissolved [4]	µg/L	1/Quarter	Grab	0.5
Thallium, dissolved [4]	µg/L	1/Quarter	Grab	0.2
Zinc, dissolved [4]	µg/L	1/Quarter	Grab	10
Cyanide, total	µg/L	1/Quarter	Grab	5

Footnotes:
1. See Definition section at end of permit for explanation of terms.
2. Requires recording device or totalizer; permittee shall report daily maximum and daily average flow on DMR.
3. Calculated as the sum of Nitrate + Nitrite (as N) and Total Kjeldahl Nitrogen (as N) concentrations.
4. Sample filtration through a 0.045 µm membrane filter (DEQ-7, February 2008).

VIII. Special Conditions

Ground water sample collection, preservation and analysis shall be conducted according to ARM 17.30.1007 and "Non-Point Source Water Quality Standard Operating Procedures" (4/1/95) at http://deq.mt.gov/wqinfo/monitoring/SOP/pdf/10-0.pdf.

By **June 1, 2009**, the applicant is required to develop and implement a site specific Standard Operating Procedure (SOP) manual and a Sampling and Analysis Plan (SAP) for monitoring and sampling the ground water monitoring wells. The applicant must submit a written report to the Water Protection Bureau that documents the preparation and implementation of the SOP manual and SAP. Copies of the SOP manual and SAP do not need to be submitted to the Department by the required report date, but a copy of the SOP manual and SAP must be maintained on-site.

IX. Nonsignificance Determination

The Department has determined the proposed discharge is nonsignificant and there will be no degradation of state waters [Montana Nondegradation Policy [75-5-303, MCA; ARM 17.30.702(16)]. A mixing zone is not authorized, so water quality standards apply at the end of control. The effluent limits for total N and metals are based on the criteria established to meet nonsignificance criteria at ARM 17.30.715.

X. Information Source

Montana Statute, "Montana Water Quality Act", Title 75-5-101-605, Montana Code Annotated (MCA).

Administrative Rule of Montana (ARM) at:

- Subchapter 5: Mixing Zones in Surface and Ground Water. March 2006
- Subchapter 6: Montana Surface Water Quality Standards. March 2006.
- Subchapter 7: Nondegradation of Water Quality. March 2006.

DEQ. Silver Star district abandoned mines. Available online at: http://www.deq.mt.gov/Abandoned Mines/likndocs/techdocs/126tech.asp. Accessed December 18, 2008.

DEQ. Circular 7 Montana Numeric Water Quality Standards. February 2008.

GWIC (Ground Water Information Center). Website: http://mbmggwic.mtech.edu/, accessed December 18, 2008.

NRCS (Natural Resource Conservation Service) Web Soil Survey (WSS). Available online at: http://websoilsurvey.nrcs.usda.gov/app/, accessed December 18, 2008.

Water and Environmental Technologies. 2007. Supplemental information submitted with initial permit applications, received October 22, 2007.

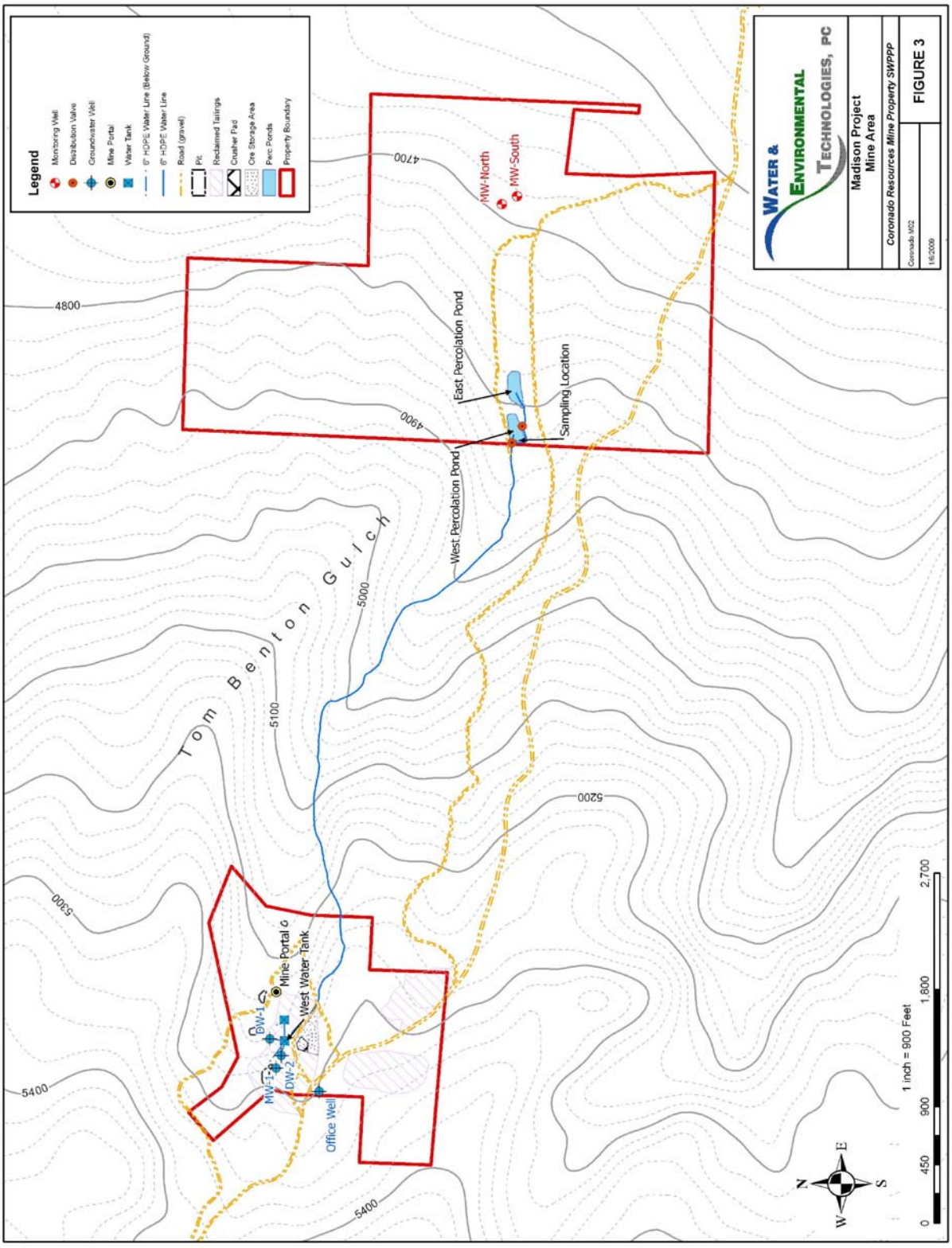

Figure 1 – Site map showing location of dewatering wells ("DW"), percolation ponds, sampling locations, and monitoring wells (MW; prepared by Water and Environmental Technologies).

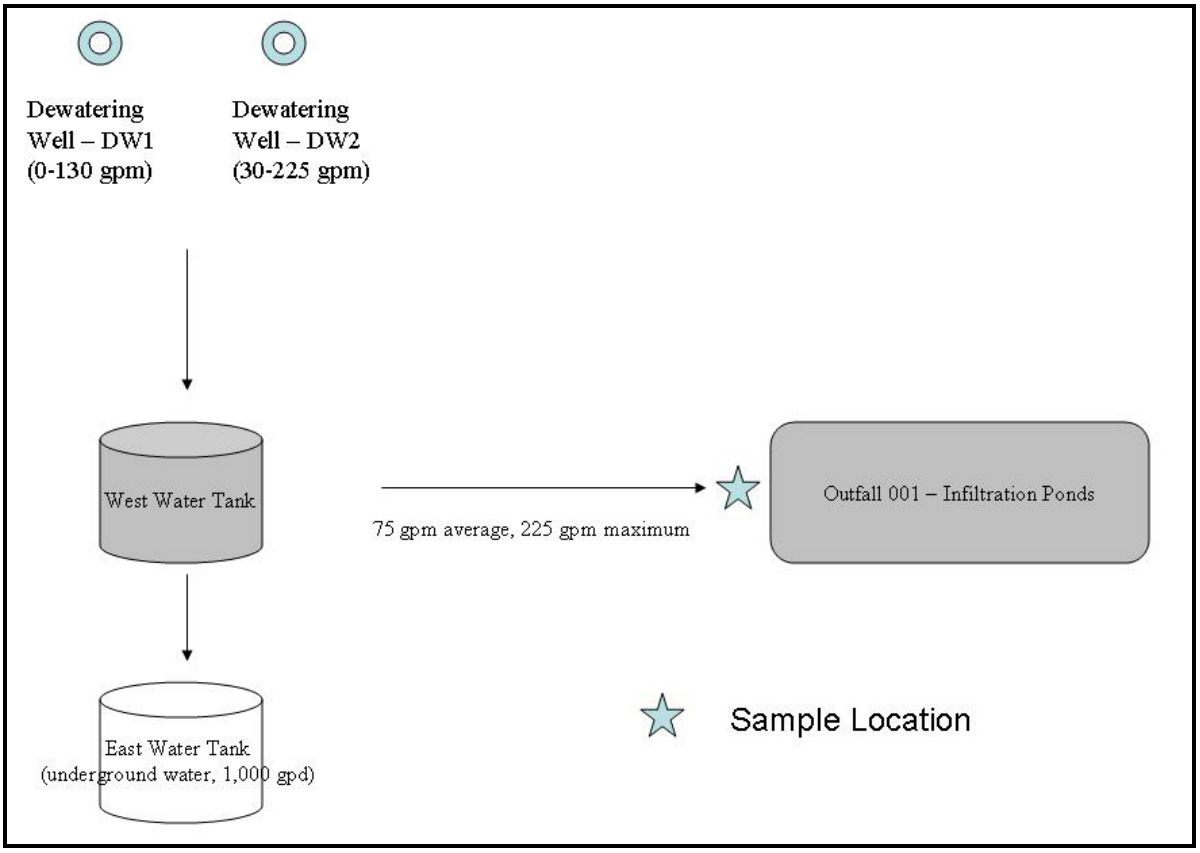

Figure 2 – Flow diagram

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